

Week 2: Social Intelligence

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Summary: Social intelligence (SI) is the study of a person's capability to perceive and understand social signals, manage and participate in social interactions, act appropriately in social settings, and establish social relations. In week 2's discussion session, the class discussed the different theories regarding social intelligence (SI) and their extensions towards artificial social intelligence (ASI). The discussion includes the definition of social intelligence, its components, evaluation, and the difference between human SI and artificial SI. The following is a list of provided research probes:

1. How would you define social intelligence? What aspects of the proposed definitions most resonated with you? Will these definitions of social intelligence generalize to artificial social intelligence?
2. Should we always try to separate social intelligence from other types of intelligence, more specifically abstract intelligence (often referred to as g-factor or general intelligence)? What are the similarities and differences?
3. Given the ups and downs of social intelligence research, what method(s) would you support to measure social intelligence (e.g., self-reports, behavioral measures,...)? Will these measures generalize to a setup involving artificial social intelligence?
4. What are the main components (aka, sub-constructs) of social intelligence? In other words, can we separate the concept of social intelligence into separate factors, separate sub-concepts? What are these components (aka, sub-constructs, sub-concepts)? Can you start drafting a taxonomy of social intelligence sub-concepts?
5. How are the methods used in psychometric testing (as mentioned on the reading papers) could be applied to our recent methods used in AI, mostly based on deep learning approaches? Are these compatible? How can we handle this uncertainty both in defining and measuring social intelligence?

As background, students read the following papers:

1. (Required) Kihlstrom and Cantor, Social Intelligence, chapter in Cambridge Handbook of Intelligence, 2020 [Kihlstrom and Cantor, 2011]
2. (Suggested) Weis, Theory and Measurement of Social Intelligence, PhD thesis, 2007 [Weis, 2008]
3. (Suggested) Sternberg and Li, Social Intelligence: What It Is and Why We Need It More than Ever Before, chapter in Social Intelligence and nonverbal communication, 2020 [Sternberg and Li, 2020]
4. (Suggested) Hinkin, A Brief Tutorial on the Development of Measures for Use in Survey Questionnaires, Organizational Research Methods, volume 1, issue 1, 2016 [Hinkin, 1998]
5. (Relevant) Conzelmann, et al., New Findings About Social Intelligence: Development and application of the Magdeburg Test of Social Intelligence (MTSI). Journal of Individual Differences, 34(3), 2013 [Conzelmann et al., 2013]
6. (Relevant) Walrath et al., Factor analytic models of intelligence, chapter in Cambridge Handbook of Intelligence, 2020 [Walrath et al., 2020]
7. (Relevant) Social Ontology <https://plato.stanford.edu/entries/social-ontology/>

We summarize several main takeaway messages from group discussions below:

1 Definition of Social Intelligence (SI)

Because social-intelligence is highly complex and context-dependent, it must be evaluated in context, through situational judgment tests. Social intelligence is the *ability to perceive and reason* about complex and nuanced social situations [Kihlstrom and Cantor, 2011]. However, social intelligence varies across cultures and subgroups and perhaps with time, which makes social intelligence quotient (SIQ) difficult to measure quantitatively with a single standard. While it is difficult to use a singular score to compare social intelligence, differences in social intelligence can be attributed to multiple factors. They are social awareness and mental facility, social perception, memory, understanding, knowledge, and flexibility in social situations [Kihlstrom and Cantor, 2011]. Future assessments of social intelligence must test the aforementioned factors, for example, the Magdeburg Tests of Social Intelligence (MTSI) only test for three out of all the attributes listed above [Conzelmann et al., 2013].

2 Components of Social Intelligence

Per existing definitions and group discussions, social intelligence may be abstractly divided into various components, as visualized in Figure 1. The blue objects indicate the components which are also common to situations which engage general intelligence. In contrast, the green objects indicate components that are specific to situations that engage only social intelligence. Social intelligence generally develops by accumulating memory and policies during social interactions. A particular memory is defined by the involved entities, the time, and the events, i.e. the who, when, and what aspects of the social context. Policies are learned in such situations and are then applied/generalized to other situations with the help of memory.

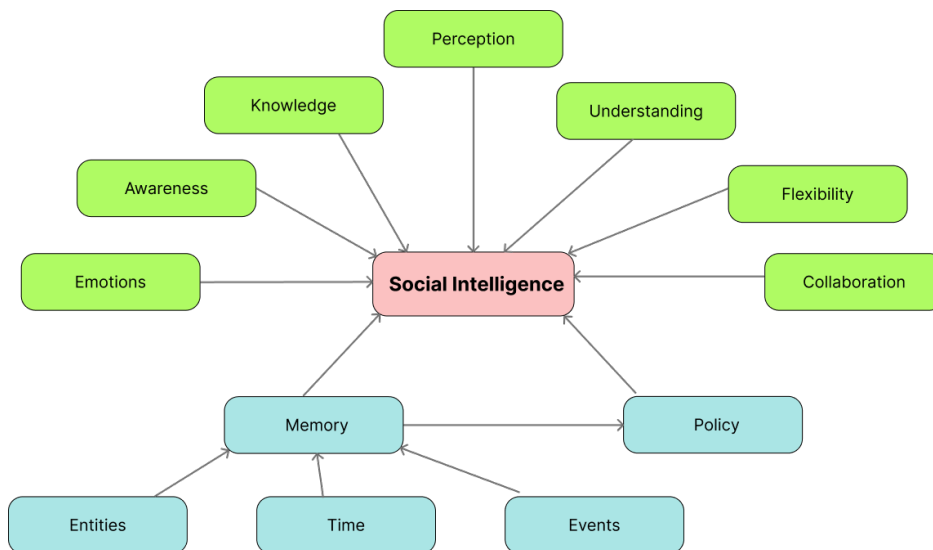


Figure 1: Different Components of Social Intelligence

Additionally, we include factors such as emotions and collaborative intelligence in the list of components. The experiences and learnings are unique to individuals, making social intelligence subjective. The person's emotions also determine social intelligence at a particular time. Consequently, the same person with the same memory states may act differently, subjective to their emotional status. Collaborative intelligence is also an important component. Besides the rules learned, convergent and divergent intelligence can also affect the outcome of collaborative social interactions.

3 Social Intelligence vs General Intelligence

The relationship between social intelligence and general intelligence is still an open question [Sternberg and Li, 2020]. To many, although social intelligence has abstract definitions, it is also a problem-solving ability. It requires the same abilities required by general intelligence, such as observing a situation and reasoning and acting with knowledge and experience. Thus, some believe social intelligence is an inseparable subsection of general intelligence. However, a large portion of social intelligence may not overlap with the g-factor. Social intelligence is implicated with emotional intelligence and morality, while the g-factor focuses on cognitive tasks such as memory, reasoning, and knowledge. Although the development of social intelligence requires such cognitive abilities, formal education which is useful for developing cognitive abilities is not sufficient for the development of social skills, understanding, etc. In contrast, emotional intelligence and morality are acquired through social interactions in daily life. Additionally, these social interactions also involve the participants forming perceptions of each other based on their actions and social skills. This process of forming opinions based on social behavior engages something more than simply general intelligence.

An understanding of the relationship between social intelligence and general intelligence is important for AI researchers. The knowledge of the kind of relationship between the two will be valuable in defining useful metrics that can successfully evaluate our artificial social intelligence systems. From the cognitive science perspective, a better understanding of the functioning of the brain will be instrumental in developing better models of the brain. Hence, future research should focus on better determining the relationship between general intelligence and social intelligence.

4 Evaluating SI and ASI

4.1 Psychometric tests

The goal of psychometric tests is to measure social intelligence. There are two ways to SI at a high level: questionnaires and tests, each with benefits and drawbacks [Hinkin, 1998].

While questionnaires are good for fast evaluation, it falls short because such pen-paper tests that engage social intelligence (SI) also engage general intelligence (GI) because of the need to read and interpret the questions. Different interpretations could skew the results; hence, the results obtained from such tests can not decouple GI from SI. Additionally, such self-test QA evaluations do not apply to AI agents. Such tests assume that the test takers already have social understanding, social awareness, morality, etc., which nascent ASI systems don't have.

Tests that replicate social interactions can't be a good measure of human social intelligence, as social intelligence is subjective to individuals, groups, cultures, etc. Such tests will not be standardizable to provide objective and reliable measurements of social intelligence across various individuals.

Additionally, most SI tests implicitly or explicitly weigh the different skills/components of SI equally; no non-uniform weighting is used. Each human may not have the same level of each social intelligence component - facility, memory, or other different aspects could be lacking. This is commonly observed in humans, they rely on each other to fill in each other's gaps to better understand a social interaction/situation. Hence, this implies that it may not be required for an ASI agent to be adept in all skills of SI to be "socially intelligent".

4.2 Real-world human interaction

ASI should be evaluated based on how it interacts with people and how users consequently react to its actions. In addition, provisions should be made in the evaluation method to consider the different effects of ASI itself and its role in society. A basic evaluation method could involve a gamified test. Instead of comparing ASI with human-level social intelligence, evaluate the evolution of ASI in social interactions/situations within simulated environments. Another level of complexity in this evaluation would involve incorporating life tasks/goals in these agents. The system would then be evaluated on how much of the goal it achieves, what

methods it adopts and how it interacts with other such agents while attaining its goals.

There are several crucial aspects to remember in such an evaluation method. First, ethical methods/steps should be encouraged, and unethical means and actions should be discouraged. Second, while simulations won't be able to model infinite permutations as experienced in life, it is important to ground these simulations in real life. Additionally, steps should be taken to simulate the different cultural and social backgrounds of various societies across the globe. Such measures would help translate the results and insights obtained from the simulation into real-world scenarios. Hence, future work could involve operationalizing such an evaluation system.

5 Human and Artificial Social Intelligence

Although there is overlap between human and artificial social intelligence, there are key aspects of human social intelligence that ASI should not have. For example, humans act with latent/hidden goals during social interactions, which makes their actions sometimes unaligned with what they express. AI systems should not have hidden goals. The benevolent lies, however, remain undecided. Some believe it is okay for AI to lie for the sake of human; others disagree. The “benefit” that AI perceives may not align with that perceived by humans.

Moreover, there are three challenges yet to overcome in terms of building an ASI. First, our current ASI is not able to perform comprehensive tasks that satisfy social interaction. Current datasets and models are specifically task-oriented and there is a lack of datasets that consists of a large spectrum of modalities, while in real life situations, it takes comprehensive characteristics to understand a social interaction. Second, it is difficult to resolve the ethical issues regarding such ASI. Collection of comprehensive data results in more bias and privacy issues that are innate in crowd sourcing data collections. There is also risk that people using the model are biased. It is also likely that the models trained by large companies may be biased towards the companies' benefit instead of the general public. Third, there may be challenges for AI to align with people's need. Despite AI's ability in specific tasks, allowing AI to collaborate with people is another challenge that requires much more perception during interactions with people. Moreover, human society evolves in a fast pace, which also poses challenge of whether an AI trained at one checkpoint can keep up with rapid contextual changes in society.

References

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